Using the flight demonstration concept as a strawman program, the potential utilization of various facility capabilities at MSFC facilities was discussed, namely: the Dynamic Overhead Telerobotic Simulator, Spacecraft Air-bearing Simulator, Flight Robotics Laboratory, Space Operations and Mechanism Test Bed, Optical Instrumentation Facilities, RF System Test Facilities, and Integration and Environmental Testing. Additional facilities exist at Redstone Arsenal.

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Automated Technologies Needed to Prevent Radioactive Materials from Reentering the Atmosphere.

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Q-1

Project SIREN (Search, Intercept, Retrieve, Expulsion Nuclear) was created to identify and evaluate the technologies and operational strategies needed to rendezvous with and capture aerospace radioactive materials (e.g., a distressed or spent space reactor core) before such materials can reenter the terrestrial atmosphere, and then to safely move these captured materials to an acceptable space destination for proper disposal. A major component of the current Project SIREN effort is the development of an interactive technology model (including a computerized data base) that explores, in building-block fashion, the interaction of the technologies and procedures needed to successfully accomplish a SIREN mission. The SIREN model will include appropriate national and international technology elements – both contemporary and projected into the next century. To obtain maximum flexibility and use, the SIREN technology data base is being programmed for use on 286-class PCs.

The major technical elements for a successful SIREN mission include: ground and space-based tracking, launch vehicles of needed payload capacity, telerobotic systems, sensors, capture technologies, and space transport, and disposal. However, Project SIREN also will impose specialized requirements including the use of dextrous aerospace systems capable of properly functioning in intense radiation and thermal environments.

The SIREN data base now being constructed will cover all the principal technology elements needed to successfully accomplish a SIREN mission. Inputs to the building block categories also should provide a valuable stimulus to those now investigating automated rendezvous and capture technology and operational requirements.

The data base provides for descriptive material covering applicable nuclear power systems, payloads, satellite orbits, tracking systems, launch systems, capture technologies, and disposal options. The capture technologies include the vehicles and propulsion stages needed to effect capture. Plans are to add the sensors and robotic arm technologies as the program matures. A list of key references is included to provide traceability.

The Mission options include performance of the entire mission of tracking, capture, and disposal or only certain aspects of the mission. Analysis is included in the program to determine the feasibility of using different components in performing a given mission. The date of the mission is input so one can evaluate the specific availability of various technologies. Analysis can be performed in interactive or in the batch mode.